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TITLE: Specified image-area
extracting method and device

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Abstract Text - ABTX (1):

A face (skin color) area of a person is
extracted with minimized error
irrespective of different skin colors of the human
races. A hue value
calculating portion determines a hue value from an
input image (RGB signal). A
primary discriminating portion extracts pixels
having hue value that lies in a
specified range defined by limiting values

outputted from a control portion. A pixel-counting portion counts the extracted pixels.

The control portion selects a threshold value for extracting a face area according to the count of the extracted pixels and outputs the threshold value to a face-area extracting portion which in turn extracts a face area according to the threshold value.

Brief Summary Text - BSTX (2):

The present invention relates to a specified image-area extracting method and a specified image-area extracting device, and more particularly, to a method of and a device for extracting, from an input image, a remarkable portion, e.g., a person's skin-color portion including their face, arms and the like as a specified image-area, which method and device are usable for a video processing device, e.g., for producing video information suitable to use in video telephones and video conferences.

Brief Summary Text - BSTX (7):

The first example of a conventional face-area extraction method divides an input image into areas by first preparing a two-dimensional histogram of hue and luminance and then extracting a peak of histogram frequencies (the number of pixels). This method, however, encounters such a problem that it is rather difficult to decide what peak corresponds to a skin color area: in practice, the white race and the black race have different hue values, i.e., erroneous

face-area extraction may arise depending upon the different races.

Brief Summary Text - BSTX (11) :

In view of the foregoing problems of conventional face-area extracting, the present invention was made to provide a skin-color-area extracting method that is capable of correctly extracting a skin-color area with no error and with a minimized amount of processing operations.

Detailed Description Text - DETX (14) :

The control portion 5 decides to which group (thick or thin) the extracted person's skin color belongs according to the counted pixel value and decides, on the basis of the above-mentioned discrimination, a range of color component values to be used for further area-extraction.

Detailed Description Text - DETX (16) :

FIG. 8 shows a sequence of operations of the control portion 5 when deciding a color area. At Step S50, a count value N is obtained. At Step S51, a proportion of a face area to an entire image is estimated at 3 to 4% of a total of pixels. In this case, the extractable person is considered to have a thin skin-color if the counted value exceeds the estimated value. At Step S52, a color component area W1 within $h_1 < H < h_2$ is decided as a specified area. On the contrary, the person is considered to have a thick skin color if the counted value does not exceed the threshold. In

this case, at Step S53, a logical sum of color areas W2 and W3 defined by h2 and h3 from the control portion 5 is determined as a specified area. Generally, h3 is set at 6.0. The area W2 is $h < H \leq 2\pi$. and the area W3 is $0 < H < h_2$. As Equation (1) for deriving a hue value is defined by an inverse cosine, the two areas W2 and W3 have hue values being successive to each other at 2π . and zero to form a substantially single area. In the face-area extracting portion 4, a face (skin-color) image area according to the threshold value and the mode outputted from the control portion 5 is extracted as, e.g., an address for a hue signal read from the frame memory 6.

Detailed Description Text - DETX (22):

According to the examination result, the control portion 5 correlates the histogram with a color area of a person with a thin skin-color (i.e., of the white race or the yellow race) if a peak was found in the area W1, or with a color area of a person with thick skin color (i.e., of the black race) if no peak was found therein. Similarly to the case of first embodiment, the control portion 5 outputs a decided color-area mode and a threshold to a face-area extracting portion 4. The face-area extracting portion 4 extracts a face (skin-color) area from a hue signal of an image read from a frame memory according to the mode and the threshold received from the control portion 5.

Detailed Description Text - DETX (36):

(1) It is possible to provide for extracting a
face (skin-color) area with
minimized error irrespective of the races.